United Nations ST/IC/1999/14

Secretariat

9 February 1999

Information circular*

To: Members of the staff

From: The Assistant Secretary-General for Human Resources Management

Subject: **Guidelines for ergonomic workstations and work with computers**

1. The purpose of the present guidelines is to provide information on key issues in arranging computer equipment and healthy, safe and efficient use of computer systems, and to update previous guidelines issued on this subject. It reflects the findings of recent studies that assess the risk potential of interaction between the user and computer equipment within the work environment.

A. Ergonomics

2. Ergonomic considerations are often complicated by the physical size and characteristics of the operators and the availability of appropriate furniture and space, which to a great extent depends on the existence of financial resources. However, the correct use and arrangement of equipment, furniture, posture and lighting are critical to the health and well-being of the users.

1. Equipment

3. All modern office computer equipment is furnished with detachable keyboards, which are fundamental requirements for an ergonomically acceptable workstation. If a mouse is used routinely, it should be as close as possible to the keyboard and at the same height or slightly higher.

4. Monitors should be fully adjustable so that the user may tilt and rotate them. Screen brightness and contrast should be adjustable. The image should not flicker and the entire display should be in sharp focus. Multicolour monitors with screens 14 inches in size should be the standard equipment. When special tasks are involved, high-resolution monitors with bigger screens, or monochrome monitors are recommended. Text-processing software that displays black characters on light background is encouraged.

2. Furniture

5. Existing desks, tables and regular office chairs may be appropriate for occasional computer users, e.g., about 30 per cent of the full work day. Otherwise, specially designed height-adjustable workstations and chairs should be installed whenever possible. Because each individual user has unique physical proportions, exact measurements of distances and height cannot be recommended. However, the adjustability of the workstation may help operators to maintain the proper posture.

6. Workstations should have independent height adjustments for keyboards and monitors. Keyboard surfaces should generally range in height from 25 to 30 inches above the floor, and the monitor platform height from 32 to 37 inches above the floor. The area of a work surface should be large enough to fit the computer equipment and all associated materials and have a non-reflective surface. Space for legs and feet should be at least 27 inches deep and 27 inches wide. Tables should be at least 32 inches deep, with ample storage space to avoid twisting the body when reaching for things.

* The present circular will be in effect until further notice.

99-03363 (E) 120299

7. Chairs should be fully adjustable. Seat height should range from 16 to 22 inches above the floor so users can firmly place their feet on the floor. If necessary, a footrest may be used. The seat size should be at least 18 inches wide and 15 to 17 inches deep. Approximately 4 inches of clearance should be kept between the seat front and the back of the knees. The front edge of the seat should have a waterfall edge to reduce stress to the legs. The seat depth should permit the lumbar area to contact the seat back and should avoid pressure at the back side of the lower legs. The back of the chair should be contoured and support the lumbar region. The backrest should give 6 to 9 inches of support, be centred 6 to 10 inches above the seat and be at the minimum 12 inches wide. The seat angle should be adjustable 0 to 10 degrees to allow positioning in a forward slant (hips higher than knees) when working in a forward arm position. The backward tilt of the seat back should range from 90 to 105 degrees. The chair should have casters appropriate for the floor surface, especially if the user has to get up and move around frequently.

8. A document holder adjusts the height and tilt angle, so that a document is in the same plain as the user is viewing. If the user looks at the screen while typing, a document should normally be in a vertical position next to the screen. If the user looks at the keyboard, a document should be flat on the desk or between the keyboard and the monitor. Printers should be located on a separate stand or table.

3. Posture

9. Proper posture is crucial for good ergonomics. The head should be kept directly over the shoulders, without straining forward or backward, and 18 to 30 inches from the screen. The height of the monitor should allow positioning the eyes at the level of the screen or lower, at an angle of approximately 15 to 20 degrees. Operators who wear eyeglasses with bifocal corrective lenses will usually need a lower monitor position or should obtain other glasses for computer use. The neck should be elongated and relaxed, with a flexion of less than 15 degrees. Shoulders should be kept down, with the chest thrust forward. The back should be upright or inclined slightly forward from the hips to maintain the natural curve of the lower back. The angle between the upper legs and the spine should be greater than 90 degrees. The chair's height or backrest position should be altered to maintain this angle. A back cushion may be used for additional back support, when needed. The elbows should be relaxed at about a 90 degree angle between the upper arm and forearm. The chair should be raised if this angle is less than 90 degrees, or the seat lowered if the angle is greater than 90 degrees. The elbows should be kept close to the sides of the body to minimize the sideways bending of the wrist. The wrists should be relaxed and in the neutral position, without flexing them up or down (the fingers are gently curved).

10. The keyboard should be flat or slightly tilted down and at or just below elbow level. If the keyboard is positioned properly, both wrists should be able to rest in a neutral position comfortably on the support surface. The computer keys that are further away should be reached with the entire arm, starting from the shoulder rather than the wrist. During active keyboard activity, the wrists should not be "anchored" to the support surface. The fingers should not be strained. It is of benefit to avoid unnecessary tension of muscles and tendons. Wrist rest pads may not be necessary if the furniture is adjusted and the posture is right. The knees should be kept slightly lower than the hips. The chair should be sloped a bit forward to facilitate the proper hip position.

4. Illumination

11. The level and type of illumination should vary with the tasks performed. Eliminating reflections and controlling glare and contrast is extremely important. Anti-glare screens may be suggested to increase comfortable illumination. Overhead fluorescent lighting, slightly lateral to the visual display unit (VDU), is most comfortable. If special work tasks require desk lights, they may be provided, taking into consideration the nature of the work, available desk space and safe and reliable wiring. Brightness and contrast on the screen must be properly adjusted.

12. The screen itself should be tilted and rotated to suit the lighting conditions in the office and to reduce glare. The screen or the back of the VDU should not be placed directly facing windows. Ideally, the monitor should be oriented so that it is at a perpendicular line with the windows and rows of lighting fixtures. The windows should be covered with drapes or blinds to prevent direct sunlight. The walls should be dark or pastel colours, with the matte finish less than 50 per cent reflective.

B. Eye health

13. According to the available scientific literature, there is no evidence to suggest that work with VDUs causes permanent vision damage. However, computer users may report certain visual symptoms. These symptoms may result from predisposed conditions or bad ergonomics. A periodic

eye examination with an ophthalmologist may help to uncover and correct any pre-existing eye conditions.

14. To promote greater visual comfort while working with VDUs an operator should take visual breaks. To rest the eyes, turn them away from the screen and look at something at least 25–30 feet away, blink several times, or close the eyes and relax. While working with computer monitors, people tend to blink less, and this may cause dry eyes, redness and a burning sensation. Visual breaks help to alleviate this problem. Sometimes artificial lubricants to supplement the eye's natural tears are of additional help.

15. The Medical Services Division provides regular visual acuity exams in conjunction with routine medical examinations. In addition, an ophthalmologist visits the Division periodically, and every staff member working with a VDU can make an appointment for an eye examination by calling extension 3–7080.

C. Work arrangements

16. Staff members whose job requires the use of computers most of their work day should arrange their job content rationally. Computer work should be alternated with any task or activity that provides free body movement and opportunity to rest the eyes. According to recent studies, five-minute breaks after 40 minutes of work are generally more effective than one long break. Supervisors should encourage staff to take such breaks. *It is strongly advised to use these breaks for body exercises, stretching the wrists and the arms, as well as for eye rest.*

17. Computers allow for greater work production at a faster pace and, aside from physical problems, may cause negative stress and nervousness among untrained or poorly trained operators. Proper training of staff in ergonomics and the use of computer equipment and software is essential to avoid these problems.

18. Training in basic software applications used in the United Nations is available through the Staff Development Services of the Office of Human Resources Management. The Medical Services Division coordinates lectures and seminars on ergonomics at the workplace and related subjects.

D. Video display units and electromagnetic fields

19. Many computer users have expressed concern about the health effect from the electromagnetic fields generated by VDUs. The present section of the guidelines provides brief information on electromagnetic fields associated with VDUs.

1. General information

20. All kinds of electric equipment, including VDUs, emit electromagnetic fields often referred to as "radiation". Electromagnetic fields also occur naturally, for example, by the magnetic field of the Earth, cosmic rays and sunlight.

2. High frequency electromagnetic fields

21. X-rays are produced inside a monitor's cathode ray tube. Modern VDUs are shielded and designed so that the levels of X-ray emission are not measurable above natural background radiation. The intensity of ultraviolet emission from a monitor screen is extremely low. It is lower than that from fluorescent lights, and much lower than that from the sun. Therefore, high frequency electromagnetic fields cannot cause any harmful effect on the health of a monitor user and do not call for any special precautions.

3. Very low and extremely low frequency electromagnetic fields

22. Very low and extremely low frequency electromagnetic fields are generated not only from the screen, but also from the sides, the back and the top of a monitor. The density of these fields decreases dramatically with distance. Readings at 25–30 inches from the monitor are usually close to the natural background level. This spectrum of electromagnetic fields has been studied for many years in order to find out if there is any association between very low and extremely low frequency electromagnetic fields and malignancies. Studies conducted among workers of power plants to determine whether very low and extremely low frequency electromagnetic fields may be considered as a risk factor for cancer have been inconclusive. The operation of VDUs has never been reported as being related to increased incidence of neoplastic diseases or increased risk of miscarriage and birth defects.

23. Any questions regarding workplace ergonomics, computer operation and health issues should be addressed to the Medical Services Division of the Office of Human Resources Management, extension 3–7080.

24. The present information circular supersedes circulars ST/IC/84/18 and ST/IC/84/18/Amend.1.